

## PATENT ABSTRACTS OF JAPAN

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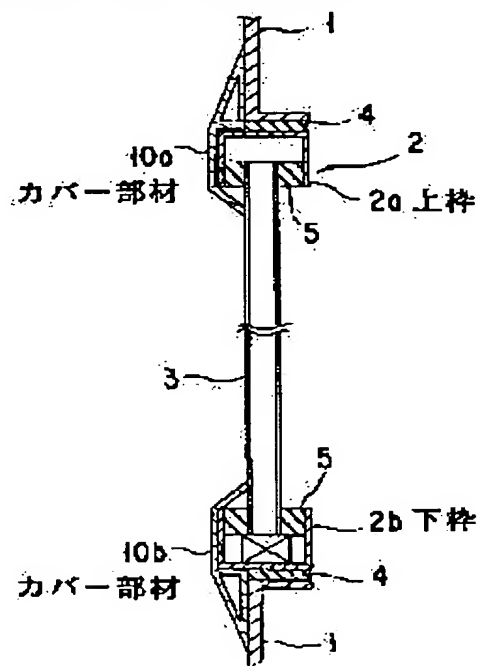
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## (54) ANTIFOULING SURFACE STRUCTURE OF BUILDING AND PANEL USED IN IT

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide an antifouling surface structure of a building capable of effectively preventing the occurrence of a part where water containing dirt is concentrated in a building to cause concentrated adhesion of dirt, and having good antifouling effect and self-cleaning effect.

**SOLUTION:** In this building having a frame 2 fitted to an antifouling wall surface formed by antifouling finished panels 1, an upper frame 2a and a lower frame 2b of the frame are respectively covered with cover members 10a, 10b so that water does not flow to be partially concentrative on the side of the frame, and the upper end edge part of at least the cover member for covering the upper frame is brought into contact with the wall surface, thereby guiding flow of water from the upper part of the frame downward through the cover member. According to another mode, a trough like drip member is provided on the upper end edge part of the upper frame of the frame or the upper end edge parts of the upper frame and the lower frame, or the joint part of the adjacent panels is sealed like a recessed part to drain water by the trough like drip member or the recessed joint part.



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## CLAIMS

[Claim(s)]

[Claim 1] The stream which leads the flow of water to a lower part or the side from the frame upper part so that water may focus partially and may not flow down to the flank of the above-mentioned frame in the building with which the frame was attached in the antifouling property wall surface -- the antifouling property surface structure of the building characterized by preparing the section or the wastewater section.

[Claim 2] The antifouling property surface structure of the building characterized by covering the cope box of a frame, and a drag flask by the covering member, respectively so that water may focus on the flank of the above-mentioned frame partially in the building with which the frame was attached in the antifouling property wall surface and it may not flow down, and a cope box contacting the upper limit edge of a wrap covering member on a wall surface at least, and it being transmitted to the covering member from the frame upper part, and making it draw the flow of water caudad.

[Claim 3] The antifouling property surface structure of the building characterized by preparing a gutter-shaped entrance along the upper limit edge of the cope box of a frame, or the upper limit edge of a cope box and a drag flask, and draining water to the side with this gutter-shaped entrance so that water may focus partially and may not flow down to the flank of the above-mentioned frame in the building with which the frame was attached in the antifouling property wall surface.

[Claim 4] The antifouling property surface structure of the building which the seal of the joint section of each adjoining panel is carried out to a concave, and is characterized by draining water by this concave joint section in the building with which the frame was attached in the antifouling property wall surface so that this wall surface consists of combination of two or more panels, and water may focus partially and may not flow down to the flank of the above-mentioned frame.

[Claim 5] The antifouling property surface structure of a building given in claim 1 to which said antifouling property wall surface is characterized by having a hydrophilic ingredient on a front face thru/or any 1 term of 4.

[Claim 6] The antifouling property surface structure of the building according to claim 5 characterized by said hydrophilic ingredient being an ingredient which has a photocatalyst operation.

[Claim 7] The panel for antifouling property surface structure construction of the building characterized by consisting of plate-like panel material by which antifouling processing was performed to the front face, and frame part material attached in the perimeter [ 1 side face ] side edge of this panel material from the edge at the predetermined distance inside.

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the reduction technique of dirt, such as building sheathing, in more detail about the panel used for the antifouling property surface structure of a building, and it.

[0002]

[Description of the Prior Art] In sheathing building materials like a curtain wall, various antifouling-ization is considered for the design nature maintenance and reduction of a maintenance cost. For example, it is shown in patent No. 2758474 that a photocatalyst ingredient demonstrates a self-consecration operation (self-cleaning operation) by the hydrophilic property. Moreover, from various coating manufacturers, the hydrophilic antifouling paint for demonstrating a self-consecration operation is also marketed.

[0003]

[Problem(s) to be Solved by the Invention] A self-cleaning operation is demonstrated by floating and flushing the dirt with which storm sewage adhered to the building-materials front face by the "hydrophilic property" of a photocatalyst, a hydrophilic antifouling paint, etc., in the surface treatment which demonstrates the antifouling effectiveness. However, the part which the water which contained the above-mentioned dirt depending on the structure of a building, such as a wall surface in which the sash frame etc. was attached, concentrates may be generated, a contamination rate may become large, and antifouling property may be unable to be demonstrated. In this case, since other parts are maintaining antifouling property, adhering dirt will be conspicuous.

[0004] It is attached as the sash frame 2 in which double glazing 3 was inserted through the sealant 5 while each [ to which it has structure as shown in drawing 12, and antifouling processing was performed ] panel 1 was incorporated by the joint section sealant 4, such as a conversion silicone system sealant, and the wall surface was constituted shows the wall surface of buildings, such as a building, to drawing 13, when it explains referring to a drawing for this. Moreover, between each panel 1, as shown in drawing 14, it is assembled through the joint section sealant 4 so that it may become the same side mostly. Therefore, since the storm sewage containing the dirt which flowed down the panel front face from the upper part of the sash frame 2 is stopped and collected by cope box 2a, and flows to the side, it flows down along with side frames 2c and 2d and dirt focuses on the side corner of drag flask 2b, and its lower part part X partially, compared with other panel parts which demonstrate the self-cleaning effectiveness, dirt will be conspicuous. Moreover, when hydrophilic antifouling processing is performed to the wall surface panel of a multi-story building etc., in order that the storm sewage which contains a lot of dirt removed in the management in the panel installed in the lower layer section may focus, sufficient self-cleaning effectiveness may be unable to be demonstrated.

[0005] Therefore, the purpose of this invention can prevent effectively that the part which the water which contained dirt in the building concentrates is generated as described above, and dirt adheres intensively, and is to continue at a long period of time and maintain [are, have in offering the antifouling property surface structure of the building excellent in the antifouling

effectiveness and the self-cleaning effectiveness,] the fine sight of the whole building finely. Furthermore, the purpose of this invention is to offer the panel for antifouling property surface structure construction of the building which can be used suitable to form such an antifouling property surface structure.

[0006]

[Means for Solving the Problem] In order to attain said purpose, according to the first side face of this invention, the antifouling property surface structure of a building provides — having — the fundamental voice — the stream which leads the flow of water to a lower part or the side from the frame upper part so that water may focus partially and may not flow down to the flank of the above-mentioned frame in the building with which the frame was attached in the antifouling property wall surface. It is characterized by preparing the section or the wastewater section.

[0007] One mode of the antifouling property surface structure of the building of this invention it is what prepares the section, the stream to which the flow of water is caudal led from the frame upper part so that water may focus partially and may not flow down to the flank of the above-mentioned frame — the more concrete mode So that water may focus partially and may not flow down to the flank of the above-mentioned frame in the building with which the frame was attached in the antifouling property wall surface It is characterized by covering the cope box and drag flask of a frame by the covering member, respectively, a cope box contacting the upper limit edge of a wrap covering member on a wall surface at least, and it being transmitted to a covering member from the frame upper part, and making it draw the flow of water caudal.

[0008] Other modes of the antifouling property surface structure of the building of this invention it is what prepares the wastewater section so that water may focus partially and may not flow down to the flank of the above-mentioned frame. The first mode So that water may focus partially and may not flow down to the flank of the above-mentioned frame in the building with which the frame was attached in the antifouling property wall surface A gutter-shaped entrance is prepared along the upper limit edge of the cope box of a frame, or the upper limit edge of a cope box and a drag flask, and it is characterized by draining water to the side with this gutter-shaped entrance.

[0009] On the other hand, the seal of the joint section of each adjoining panel is carried out to a concave, and it is characterized by draining water by this concave joint section so that the wall surface of a building consists of combination of two or more panels in the second mode which prepares the wastewater section, and water may focus partially and may not flow down to the flank of the above-mentioned frame. In order to carry out this mode furthermore according to the second side face of this invention, the panel for antifouling property surface structure construction of the building characterized by consisting of plate-like panel material by which antifouling processing was performed to the front face, and frame part material attached in the perimeter [ 1 side face ] side edge of this panel material from the edge at the predetermined distance inside is also offered.

[0010] As for an antifouling property wall surface (the same is said of said panel for antifouling property surface structure construction), also in said which mode, it is desirable to have a hydrophilic ingredient on a front face. It is desirable that it is the ingredient which has a photocatalyst operation especially as the above-mentioned hydrophilic ingredient.

[0011]

[Embodiment of the Invention] When it was the part from which water will be supplied, and it will flow and will fall if hydrophilic antifouling processing is performed conventionally, it was thought that a self-cleaning operation could be demonstrated altogether. However, by part down which piles up or concentrates and water flows, it became clear from various kinds of exposure tests that sufficient antifouling property ability could not be demonstrated, according to research of this invention persons, in such a case, control of the flow of water is important — a header — storm sewage is poured positively — or a stream — it comes to complete a header and this invention for becoming possible, even if it is the part which becomes dirty even when the conventional hydrophilic antifouling surface treatment is constructed to demonstrate a self-cleaning operation, and a fine sight and design maintenance of the whole building being attained

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by establishing - wastewater path.

[0012] namely, the stream which leads the flow of water to a lower part or the side from the frame upper part so that the antifouling property surface structure of the building of this invention may concentrate partially and water may not flow down to the flank of the above-mentioned frame in the building with which the frame was attached in the antifouling property wall surface — it is characterized by preparing the section or the wastewater section. For example, the aluminum panel which performed antifouling processing by the photocatalyst film, the hydrophilic film, etc. by hydrophilic antifouling paint or surface treatment. When building materials, such as an aluminum profile, glass, a tile, and a stone, are used for a wall surface etc. without it prepares a covering member so that irregularity of the cope box of a frame, a drag flask, etc. may be made gently-sloping, and water piles up and focuses on specific parts, such as a frame both-sides corner, — making a building-materials front face flow equally \*\*\*\* — or a stream — the flow of water is led to the side by establishing a path and a wastewater path. [0013] Thus, by controlling the flow of water and avoiding partial concentration of the storm sewage containing dirt, it continues, there is also no stagnation of the dirt in a specific part, it is stabilized and the antifouling effectiveness by the photocatalyst film or the hydrophilic film and the self-cleaning effectiveness can be demonstrated at a long period of time, it can continue and the fine sight of building sheathing can be maintained at a long period of time. As a building or building materials, all things, such as sheathing building materials (a wall surface, roof, etc.), such as a building and a residence, bathroom structure, the Sun Rühr, a terrace, a balcony, and exterior products (an outside LGT, bench, etc.), are contained, and it is not limited to a specific building or building materials.

[0014] Hereafter, the suitable embodiment of this invention is explained, referring to an accompanying drawing. Drawing 1 and drawing 2 show one embodiment of the antifouling property surface structure of the building concerning this invention. While being incorporated by the joint section sealants 4, such as a conversion silicone system sealant, and constituting the wall surface, each panel 1 by which antifouling processing was performed to the front face It is the same as that of the above mentioned conventional example that the sash frame 2 with which the double glazing 3 with which antifouling processing was performed was similarly inserted in the front face through the sealants 5, such as a conversion silicone system sealant, is attached. In this embodiment, the covering members 10a and 10b are attached so that cope box 2a of the sash frame 2 and drag flask 2b may be covered, respectively.

[0015] As each covering members 10a and 10b are clearly shown in drawing 2, the cross-section surface section is carrying out loose trapezoidal shape. In addition, as for the front face of the covering members 10a and 10b, it is desirable to be able to consider as the shape of a more gently-sloping curve as well as the antifouling processing panel 1 (half-elliptical etc.), and to perform antifouling processing to the front face. Moreover, the upper limit edge of up covering member 10a touches a panel 1, the lower limit edge touches glass 3, and the upper limit edge of lower covering member 10b touches glass 3, and the lower limit edge touches the panel 1. Therefore, after the storm sewage containing the dirt which flowed down the panel front face of the sash frame 2 upper part flows down cope box 2a as it is on wrap covering member 10a and washes glass 3 front face, it flows down drag flask 2b as it is on wrap covering member 10b. Therefore, like before, it is stopped by cope box 2a, it is collected, and flows down along with side frames 2c and 2d, it is prevented that dirt focuses on the side corner and its lower part part of drag flask 2b partially, and a self-cleaning operation of each panel 1 by which antifouling processing was performed, and glass 3 is demonstrated effectively.

[0016] As an ingredient which has the antifouling operation used for antifouling processing, the ingredient layer which has an antifouling operation of the hydrophilic film, the photocatalyst film, etc., especially the ingredient layer which has a photocatalyst operation are used suitably. Although the film containing an inorganic system oxide, especially a silica system oxide is suitably used as hydrophilic film, and dirt stops being able to adhere easily by making a front face into a hydrophilic property and it becomes easy to clean with storm sewage, wash water, etc., it is desirable to use the building material which prepared the photocatalyst film which disassembles dirt positively especially according to a photocatalyst operation. Demonstrating

antibacterial and a mildew resistant effect by the reactive oxygen species produced under an optical exposure is known, and a photocatalyst particle becomes possible [ it not only can reducing the dirt of sheathing building materials, but preventing generating of a bacillus or mold ].

[0017] As said photocatalyst film, it can consider as well-known various photocatalyst film conventionally. Moreover, the thin film which consists of the semi-conductor itself which shows a photocatalyst operation and the thin film formed only from a photocatalyst particle. To the thin film and pan which are formed from the photocatalyst particle which supports the particle of an antibacterial metal or antibacterial metallic compounds Various modes, such as film formed from a photocatalyst particle or the mixture which accepted the need further, added the particle of an antibacterial metal or antibacterial metallic compounds in the binder of a suitable inorganic system and an organic system or the coating, and was distributed, are included. Moreover, you may be which structures, such as a continuation thin film, a discontinuous thin film, and an island-shape distribution thin film, and the structure of the photocatalyst film is not further restricted to a monolayer, and is good also as a multilayer configuration. Furthermore, it can also consider as the two-layer structure with an oxidizer or/and an oil repellent agent, or the photocatalyst film that made the photocatalyst operation accelerator add or/and support further on the film front face in the photocatalyst film which consists of an ingredient containing a semi-conductor particle or a semi-conductor particle, and the film.

[0018] Electronic-hole mobility is comparatively large, as a semi-conductor which has a photocatalyst operation, if it is the semi-conductor which has a photocatalyst operation, all are usable, for example, although TiO<sub>2</sub>, SrTiO<sub>3</sub>, ZnO, CdS, and SnO<sub>2</sub> grade are mentioned, TiO<sub>2</sub> is desirable also especially in these. Moreover, if will use the semi-conductor particle which deposited an antibacterial metal or antibacterial metallic compounds on the front face, for example if an antibacterial metal or antibacterial metallic compounds, such as silver, copper, and zinc, are made to live together with the semi-conductor which has such a photocatalyst operation, or it is made to distribute with a semi-conductor particle in the photocatalyst film or is made to adhere to a photocatalyst film front face, even if it is Nighttime when light is not irradiated, antibacterial and fungus resistance will come to be maintained.

[0019] As a gestalt of the semi-conductor which has a photocatalyst operation, an antibacterial metal, or antibacterial metallic compounds The gestalt of each particle, the gestalt with which an antibacterial metal or antibacterial metallic compounds has adhered partially (or some particles may be overall) on the front face of a photocatalyst particle. The gestalt with which minerals binder particles, such as a silica, have adhered to the front face of a photocatalyst particle partially. The minerals binder particle to which the gestalt, the antibacterial metal, or the antibacterial metallic compounds with which a minerals binder particle, an antibacterial metal, or antibacterial metallic compounds has adhered to the front face of a photocatalyst particle partially has adhered can adopt various gestalten, such as a gestalt adhering to the front face of a photocatalyst particle.

[0020] About 10nm - 300nm about 1 micrometer or less about 5nm or more is preferably suitable for the particle size of the photocatalyst particle to be used. If particle size becomes smaller than 5nm, a band gap will become large according to a quantum size effect, and if it is not under the lighting which generates short wave Nagamitsu, such as a high pressure mercury vapor lamp, there is a problem that a photocatalyst operation is not acquired. Moreover, if particle size is too small, handling will also produce the problem that it is difficult or the dispersibility to the inside of a binder worsens. From the point of handling nature, the particle size of 10nm or more is desirable. Since a comparatively big photocatalyst particle will exist in a construction material front face on the other hand when particle size exceeds 1 micrometer, the particle which surface smoothness became scarce and was exposed to the front face also becomes easy to drop out. When surface smoothing etc. is taken into consideration, the particle size of 300nm or less is desirable.

[0021] Moreover, when forming the photocatalyst film on the ingredient in which various organic materials and organic coating were formed, it is desirable to make the interlayer of about 3.2 micrometers or more of thickness who consists of an ingredient which is not invaded according to

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to a photocatalyst operation intervene between an organic base material (organic coating) and the photocatalyst film so that an organic base material (organic coating) can not be invaded according to a photocatalyst operation. As the middle class who is not invaded according to a photocatalyst operation, the thin film of various inorganic materials, such as ceramics, such as a silica, an alumina, indium oxide, a zirconium dioxide,  $\text{SiO}_2\text{-MO}_x$  ( $\text{MO}_x$  is at least one sort of metallic oxides of P2O5, B-2s O3 and ZrO2, and Ta2O5 grade) or a nitride, an acid nitride, a sulfide, carbide, and carbon, can be used suitably. Moreover, it is not invaded according to a photocatalyst operation, or the thin film of organic materials, such as silicone resin which is very hard to be invaded, and polytetrafluoroethylene, can also be used. In addition, these ingredients can be used also as a basis (binder) of the distributed coating of a photocatalyst particle.

[0022] Furthermore, organic substance oxidative degradation capacity can be remarkably raised by the synergistic effect of the organic substance oxidative degradation by photocatalyst operation, and the organic substance oxidative degradation by the oxidizer by making the inside of the photocatalyst film, or/and a photocatalyst film front face add or/and support an oxidizer. As such an oxidizer, oxides, such as a sulfate of the permanganate of the chromate of  $\text{Na}_2\text{CrO}_4$  grade and a chromic-acid related compound, and  $\text{KMnO}_4$  grade, the nitrate of  $\text{AgNO}_3$  grade and a nitric-acid related compound, and  $\text{CuSO}_4$  grade, metal chlorides of  $\text{FeCl}_3$  grade,  $\text{CuO}$ , and  $\text{Ag}_2\text{O}$ , etc. are mentioned. Moreover, by making the inside of the photocatalyst film or/and photocatalyst film front face other than the above-mentioned oxidizer add or/and support at least one sort of metallic compounds, such as a chloride of metal metallurgy group ion, such as Au, Ag, Pt, Pd, and Cu, and these metals, a sulfide, and a nitric-acid compound, as a photocatalyst operation accelerator, a photocatalyst operation can improve further and contamination can be reduced further. In addition, most of these metal metallurgy group compounds act also as the antibacterial metal mentioned above or antibacterial metallic compounds.

[0023] Moreover, the ingredient which has water repellence or/and oil repellency which are later mentioned in the photocatalyst film can be added, or it can also apply to a photocatalyst film front face, and the chemical compatibility for the photocatalyst film and fats and oils can be reduced by it, namely, oil repellency can be raised. This is effective for antisticking for fats and oils, such as silicon oil which oozes from the conversion silicone system sealant used as joint section sealant 4 grade. As for the usual photocatalyst film, causing the lipophilic-ized phenomenon of falling also for the contact angle of various fats-and-oils components is known under the optical exposure by the photocatalyst film front face under an optical exposure is excellent in the chemical compatibility not only over water but various fats-and-oils components, when the amount of fats and oils adhere, it becomes difficult for water to enter into the interface of a part for these fats and oils and the photocatalyst film, and to make the amount of fats and oils emerge. However, if the inside of the photocatalyst film or/and a photocatalyst film front face are made to add or/and support water repellence or/and an oil repellent agent, oil repelling of the photocatalyst film are made small, water will enter into the interface of a part for fats and oils, and the photocatalyst film, it will become that it is easy to make the amount of fats and oils emerge, and it will become possible to flush easily a part for these fats and oils that emerged with water.

[0024] Drawing 3 thru/or drawing 5 show other embodiments of the antifouling property surface structure of the building concerning this invention, each panel 1 by which said hydrophilic antifouling processing (the followings, such as hydrophilic film and photocatalyst film, — the same) which was carried out was performed to the front face, although it is the same as that of said embodiment that it is incorporated by the joint section sealants 4, such as a conversion silicone system sealant, and the wall surface is constituted Between cope box 2a of the sash frame 2 with which it replaced with the covering member and the double glazing 3 with which hydrophilic antifouling processing was performed was inserted in the front face through the sealants 5, such as a conversion silicone system sealant, and drag flask 2b, and each panel 1 it

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compound, silicone, etc. are mentioned, if it can apply and sink in, there will be especially no limit. Moreover, the water-repellent sex skin film or films, such as polytetrafluoroethylene (Teflon), etc. are applicable. Moreover, as an example of an ingredient of having oil repellency, oil-repellent compounds, such as a fluorine compound and a silicone compound, are mentioned. More specifically, there are Asahi guard AG by Asahi Glass Co., Ltd. J-400 series, AG-900 series, AG-600 series, SUMIRO philharmonic [ by Sumitomo Chemical Co., Ltd. ]-EM series, the NK guard-FGN series made from Japanese Flower Chemistry, tex guard [ by Daikin Industries, LTD. ]-TG series, DIKKU guard [ by Dainippon Ink & Chemicals, Inc. ]-F series, NH-10 series, CP series, Sumitomo 3M Scotch whisky guard-FC series, Teflon [ by E. I. du Pont de Nemours & Co. ]-Teflon series, etc.

[0029] Drawing 6 and drawing 7 show the antifouling processing panel which can be used suitable for other embodiments which prepare the wastewater section. This antifouling processing panel 12 consists of plate-like panel material 13 to which hydrophilic antifouling processing which was described above on the front face was performed, and frame part material 14 attached in the perimeter [ 1 side face ] side edge of this panel material 13 from the edge at the predetermined distance inside. In addition, a sign 15 is the reinforcement member attached along with the rear-face center line of the panel material 13.

[0030] As shown in drawing 8, the nest of the above-mentioned panel 12 is constructed with inner joint structure so that the joint section sealant 4 may intervene and the concave joint section 16 may be formed between the frame part material 14 of the adjoining panel 12. In the antifouling property wall surface structure of this embodiment, the water which flows down panel 12 front face of a wall surface flows into the concave joint section 16, is twisted this concave joint section 16, and is led to the side and a lower part. Therefore, also in the wall surface structure of this embodiment, it is prevented that dirt focuses on the part of the side corner of a frame partially like before, and a self-cleaning operation of each panel material to which hydrophilic antifouling processing was performed is demonstrated effectively.

[0031] Drawing 9 shows other examples of a configuration of the wall surface structure built using the antifouling processing panel 12 shown in said drawing 8. In this wall surface structure, although the lengthwise direction joint section between the upper panels 12 is constituted in the shape of a straight line, the lengthwise direction joint section between the lowermost panels 12 has shifted so that it may be located in the core of an upper panel. In the case of such wall surface structure, it is easy to concentrate the water which contained in the Y section dirt (a part for the fats and oils which oozes from a joint section sealant is included) with the conventional joint section structure. Consequently, since the water which flows down panel 12 front face flows into the concave joint section 16, is twisted this concave joint section 16, and is led to the side and it is caudal led further again when it constructs using said panel 12 although it is easy to generate dirt A self-cleaning operation of each panel by which hydrophilic antifouling processing was performed is demonstrated effectively, and generating of partial dirt is prevented.

[0032] As mentioned above, although the suitable embodiment of this invention was explained, this invention is not limited to the above mentioned embodiment, and can be carried out in various modes. For example, a panel-layout gestalt as used the antifouling property panel shown in said drawing 8 and drawing 7 also for construction of the antifouling property wall surface structure shown in the antifouling property wall surface structure shown in said drawing 1 and drawing 2 and drawing 3, and drawing 4 and shown in drawing 9 also in this case is employable. Furthermore, although it is the best gestalt to constitute so that the upper limit edge of upper covering member 10a contacts a panel 1, a lower limit edge contacts glass 3, and the upper limit edge of lower covering member 10b may contact glass 3 and a lower limit edge may contact a panel 1 as shown in drawing 2 when using a covering member. When the self-cleaning of a glass side is unnecessary, it can avoid carrying out antifouling processing of the glass front face. Moreover, it is also possible to constitute so that it may be made for the lower limit edge of upper covering member 10a not to contact glass 3 (for example, width of face of the slant surface part which faces caudal is shortened, or it deletes) or the upper limit edge of lower covering member 10b may not contact glass 3 further. Moreover, it is also possible to consider as next structure

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differs in that the cross-section mold [ of L characters ] gutter-shaped ridge members 11a and 11b are attached through the joint section sealant 4, respectively. Moreover, the installation mode of ridge member 11a (11b) of a between [ each panel 1 ] is as being shown in drawing 5, and the joint section sealant 4 intervenes between ridge member 11a and an upper panel 1. In addition, it is desirable to perform hydrophilic antifouling processing also like the front face of the ridge members 11a and 11b.

[0025] The storm sewage which contains the dirt which flowed down the panel front face of the sash frame 2 upper part in this embodiment. The storm sewage containing the dirt which was collected by ridge member 11a installed along with cope box 2a of a frame 2, and flowed down glass 3 and the panel front face of the flank it is brought together in the vertical drain (not shown) which were collected by ridge member 11b installed along with drag flask 2b of a frame 2, and was led to the side, respectively, for example, was installed in the building corner. Therefore, also in the wall surface structure of this embodiment, it is prevented that dirt focuses on the part of the side corner of a frame 2 partially like before, and a self-cleaning operation of each panel material 1 to which hydrophilic antifouling processing was performed is demonstrated effectively. In addition, it is more desirable to prepare, since it will become easy to concentrate dirt on the lower part of the side corner of drag flask 2b partially if a menstruation fault is carried out for years although there may not necessarily be ridge member 11b installed along with drag flask 2b of a frame 2.

[0026] Moreover, it is desirable to perform hydrophilic antifouling processing to the side face of the above-mentioned ridge members 11a and 11b, and to prepare the ingredient layer which has water repellence or/and oil repellency in an inferior surface of tongue. When this performs hydrophilic surface treatment to a part parallel to a ground side like eave soffit section with the same said of the slant face which faced under the covering members 10a and 10b as shown in said drawing 2, Although it is a hydrophilic property therefore, a drop to the extent that the water screen falls with breadth and gravity is not formed, consequently draining [ of water ] becomes inadequate, and when the water containing dirt dries, dirt adheres. Moreover, when hydrophilic antifouling processing is performed to the part where the wall surface and the eave soffit continued, it piles up, and in order to dry, it becomes easy for the water which also contained the dirt of the wall surface section in the eave soffit section to flow in, and to produce dirt especially in the eave soffit section. Moreover, since the wall surface section demonstrates antifouling property and dirt is not conspicuous, the dirt of the eave soffit section will be emphasized further. It was found out that water repellence or/and the oil repellency are more advantageous in order to demonstrate antifouling property by such part according to research of this invention persons, and it was found out further that antifouling property can be effectively demonstrated by the thing as which antifouling property is required and which a hydrophilic operation, water repellence, or/and an oil-repellent operation are used properly, and it compounds, and is used for every part.

[0027] In the building or construction material which has an parallel part the same — a ground side and abbreviation — a perpendicular part and abbreviation — the above-mentioned abbreviation — by preparing the ingredient layer which has water repellence or/and oil repellency in the front face (both an inferior surface of tongue and a top face being included) of an parallel part, also in this part, water is easy to be drained, and when the water containing dirt dries, it can prevent effectively that dirt adheres. On the other hand — a ground side — receiving — abbreviation — such antifouling effectiveness and self-cleaning effectiveness are demonstrated by preparing the ingredient which has an antifouling operation, for example, the ingredient which has said hydrophilic operation which was carried out and photocatalyst operation, in the front face of the part which inclined in the front face of a perpendicular part, and the slanting upper part. Therefore, by the thing as which antifouling property is required and which a hydrophilic operation and a water-repellent operation are used properly, and it compounds, and is used for every part, it becomes possible to demonstrate antifouling property effectively, and it can continue and the fine sight of building sheathing can be maintained at a long period of time.

[0028] As an ingredient which has water repellence, although a fluorine-containing shiran

[http://www4.ipdl.ncipi.go.jp/cgi-bin/tran\\_web.cgi\\_ejie](http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web.cgi_ejie)

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in junction between panels.

[0033] [Example] although an example and the example of a comparison are shown and the effectiveness of this invention is explained still more concretely hereafter, it comes out that this invention is not what is limited to the following example from the first.

[0034] On the dimension 1000mmx1000mm [ of the configuration shown in sample 1 drawing 11 ] (3mm in thickness) aluminum plate (A1100), fluorine paint (DEYUFURON K500 by Nippon Paint Co., Ltd., a color: white) was performed. Subsequently, the spray coating cloth of the photocatalyst film coating agent "Bisto RETA NSC-200A" by Nippon Soda Co., Ltd. is carried out on this fluorine paint film. Heat for 30 minutes, it was made to harden at 90 degrees C, and the middle class was formed, further, on this, carried out the spray coating cloth of the photocatalyst film coating agent "Bisto RETAL and NSC-200C" by Nippon Soda Co., Ltd., and heat for 30 minutes, it was made to harden at 120 degrees C, the photocatalyst layer was formed, and photocatalyst antifouling paint was performed.

[0035] Fluorine paint (DEYUFURON K500 by Nippon Paint Co., Ltd., a color: white) was performed to the panel material front face of the panel made from aluminum of the configuration shown in sample 2 drawing 6 and drawing 7 (dimension 1000mmx1000mm). Subsequently, the spray coating cloth of the photocatalyst film coating agent "Bisto RETA NSC-200A" by Nippon Soda Co., Ltd. is carried out on this fluorine paint film. Heat for 30 minutes, it was made to harden at 90 degrees C, and the middle class was formed, further, on this, carried out the spray coating cloth of the photocatalyst film coating agent "Bisto RETAL and NSC-200C" by Nippon Soda Co., Ltd., and heat for 30 minutes, it was made to harden at 120 degrees C, the photocatalyst layer was formed, and photocatalyst antifouling paint was performed.

[0036] Photocatalyst coating agent ST-K03 by Ishihara Sangyo Kaisha, Ltd. was applied to the sample 3 dimension 800mmx800mmx5mm glass plate, and the photocatalyst film was formed.

[0037] As shown in example 1 drawing 1 and drawing 2, the sash incorporating the panel of a sample 1 and the glass plate of a sample 3 has been arranged, and the covering members 10a and 10b which consist of an aluminum extruded section, respectively so that a sash cope box and a drag flask may be covered were further attached between the sash cope box and the drag flask, and the panel.

[0038] As shown in example 2 drawing 3 and drawing 4, the sash incorporating the panel of a sample 1 and the glass plate of a sample 3 has been arranged, and the ridge members 11a and 11b were further attached along with the edge section of a sash cope box and a drag flask, respectively.

[0039] The sash incorporating the panel of example 3 sample 2 and the glass plate of a sample 3 has been arranged as shown in drawing 10, and it constructed with inner joint structure as shown in drawing 8.

[0040] The sash incorporating the panel of example of comparison 1 sample 1 and the glass plate of a sample 3 was attached as shown in drawing 10. In addition, said examples 1 and 2 and the example 1 of a comparison are the usual joint structures as shown in drawing 14.

[0041] Each panel nest object of the example of trial 1 aforementioned examples 1-3 and the example 1 of a comparison was set up to the outdoors, and was exposed half a year, at least each part shown in drawing 10 measured color difference  $\Delta E^*$  after exposure of a= after that, and the contamination situation was judged. Here,  $\Delta E^*$  shows the difference between the hue before exposure, and the hue after exposure, and shows that the contamination situation was so remarkable that this figure was large. The measurement result of color difference  $\Delta E^*$  is shown in Table 1.

[0042]

[Table 1]

[http://www4.ipdl.ncipi.go.jp/cgi-bin/tran\\_web.cgi\\_ejie](http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web.cgi_ejie)

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測定部位	実施例 No.			比較例 1
	1	2	3	
a	1.5	1.4	1.5	1.5
b	1.7	1.4	1.7	5.3
c	1.5	1.4	1.6	1.3
d	1.8	1.4	1.8	1.3
e	1.7	1.4	1.7	5.7
f	1.4	1.4	1.4	1.4
g	1.3	1.3	1.3	1.3

As shown in Table 1, the color difference of the b section of the example 1 of a comparison and the e section was large, and it has checked that muscle-like dirt had also produced viewing. This is a phenomenon produced in order to collect the storm sewage containing the dirt of the panel above a sash, to concentrate on a sash both-sides corner and to flow and fall with a sash frame. On the other hand, in the examples 1-3, even if it is which part, the almost same color difference is shown. This reason is as follows.

Example 1: It is because water flowed down the sash and the glass side equally and did not focus on a sash both-sides corner.

Example 2: It is because the storm sewage which contained dirt by the ridge member was discharged out of the panel.

Example 3: By making it inside joint structure, it is because the water containing dirt flowed and did not concentrate the inside of an inner joint on a sash both-sides corner.

[0043] Each panel nest object of the example of trial 2 aforementioned example 1 and the example 1 of a comparison was set up to the outdoors, and was exposed half a year, and the light permeability of the glass plate core exposure before and after exposure was measured. The result is shown in Table 2.

[0044]

(Table 2)

例 No.		可視光透過率 (%)
実施例 1	暴露前	95
	暴露後	90
比較例 1	暴露前	95
	暴露後	78

As shown in Table 2, it turns out that there is little decrement before and behind exposure of the light permeability of the glass plate of an example 1 compared with the example 1 of a comparison. This is the effectiveness that the water from a upside panel side was equally supplied to the glass side, in the example 1, although the moisture which flows into a glass side from a upside panel with a sash cope box is intercepted in the example 1 of a comparison.

[0045] For that it becomes possible to make stability demonstrate the fine sight and design of the building materials which could prevent concentration of dirt when making it distribute, without centralizing water partially, as a result carried out antifouling processing over a long period of time from the panel of an example 1 and the example of glass in the above trial, and reservation of antifouling property, it has checked that it was effective to make it flow down, without centralizing water. furthermore, the wastewater path from the example of the panel of an example 2 and an example 3 and a stream — it has checked that it became possible to demonstrate to stability the fine sight and design of the building materials which prevented concentration of dirt, as a result carried out antifouling processing over a long period of time by establishing a path intentionally and controlling the flow of water.

[0046] Except making joint structure of the lowermost panel and the panel on it into

discontinuity, as shown in an example 4 - 6 drawing 9, when the panel nest object was produced like said examples 1-3 and having been examined like examples 1-3, the same result as examples 1-3 was obtained, and it was checked that generating of dirt can be prevented also with such joint structure.

[0047]

[Effect of the Invention] as mentioned above, according to the antifouling property panel used for the antifouling property surface structure of the building of this invention, and it flows down to homogeneity, without centralizing water partially — making — or a wastewater path and a stream, in order to establish a path intentionally and to control the flow of water it can prevent effectively that the part which the water containing dirt concentrates is generated in a building, and dirt adheres to it intensively, it can be stabilized effectively and the antifouling effectiveness of antifouling property building materials and the self-cleaning effectiveness can be demonstrated, it can continue at a long period of time, and the fine sight and design of building sheathing can be maintained finely.

[Translation done.]

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[Translation done.]

## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

- [Drawing 1] It is the outline partial front view of an example of the antifouling property surface structure of the building concerning this invention.
- [Drawing 2] It is the outline fragmentary sectional view of the panel-sash joint of the antifouling property surface structure shown in drawing 1.
- [Drawing 3] It is the outline partial front view of other examples of the antifouling property surface structure of the building concerning this invention.
- [Drawing 4] It is the outline fragmentary sectional view of the panel-sash joint of the antifouling property surface structure shown in drawing 3.
- [Drawing 5] It is the outline fragmentary sectional view of the joint between panels of the antifouling property surface structure shown in drawing 3.
- [Drawing 6] An example of the antifouling property panel used for the antifouling property surface structure of the building concerning this invention is shown, (A) is a front view and (B) is a right side view.
- [Drawing 7] It is the VII-VII line sectional view of the antifouling property panel shown in drawing 6.
- [Drawing 8] It is the sectional view of the joint at the time of the nest of the antifouling property panel shown in drawing 6.
- [Drawing 9] It is the front view showing other examples of an arrangement gestalt of the antifouling property panel shown in drawing 6.
- [Drawing 10] It is the front view of the panel nest object in which the color difference measurement part of the example 1 of a trial is shown.
- [Drawing 11] The antifouling property panel of a sample 1 used in examples 1 and 2 and the example 1 of a comparison is shown, (A) is a front view and (B) is a sectional view.
- [Drawing 12] It is the outline partial front view of an example of the antifouling property surface structure of the conventional building.
- [Drawing 13] It is the outline fragmentary sectional view of the panel-sash joint of the antifouling property surface structure shown in drawing 12.
- [Drawing 14] It is the outline fragmentary sectional view of the joint between panels of the antifouling property surface structure shown in drawing 12.
- [Description of Notations]
- 1 12 Antifouling processing panel
  - 2 Sash Frame
  - 2a Cope box
  - 2b Drag flask
  - 3 Antifouling Processing Double Glazing
  - 4 Joint Section Sealant
  - 10a, 10b Covering member
  - 11a, 11b Ridge member
  - 16 Concave Joint Section